



Evaluation Report for
Washington State Consortium
Nurse Home Visit Program

Time Span: Initiation through August 31, 2001

The National Center for Children,
Families and Communities

CONTRIBUTORS

Ruth O'Brien, PhD
Maureen McClatchey, PhD
Don R. Easton-Brooks, PhDc

PUBLICATION DESIGN
Chris Garcia

CONTENTS

LIST OF TABLES	IV
LIST OF FIGURES.....	VI
EXECUTIVE SUMMARY	VII
PROGRAM MODEL	VII
EVALUATION OF THE NURSE HOME VISITATION PROGRAM	
IMPLEMENTATION.....	VII
RECRUITMENT AND RETENTION OF PARTICIPANTS	VIII
THE CONTENT AND PROCESS OF HOME VISITS	VIII
EVALUATION OF PROGRAM OUTCOMES.....	VIII
CHANGE IN MATERNAL HEALTH HABITS	VIII
GESTATIONAL AGE AND BIRTH WEIGHT	IX
IMMUNIZATIONS.....	IX
INFANT EMERGENCY ROOM VISITS AND HOSPITALIZATIONS	IX
WORKFORCE AND SCHOOL PARTICIPATION	IX
USE OF COMMUNITY SUPPORT PROGRAMS	X
INTRODUCTION.....	2
NURSE HOME VISITATION OVERVIEW	3
THE PROGRAM MODEL	3
BASIC COMPONENTS OF THE EVALUATION PLAN.....	3
CHARACTERISTICS OF PARTICIPANTS AT PROGRAM ENTRY.....	4
AGE, EDUCATION, AND MARITAL STATUS.....	4
RACIAL AND ETHNIC DESIGNATION.....	4
STATUS OF PARTICIPANTS AS FIRST-TIME MOTHERS.....	5
WORKFORCE PARTICIPATION AND HOUSEHOLD INCOME.....	5
GESTATIONAL AGE OF PARTICIPANTS AT PROGRAM ENTRY	5
MATERNAL SENSE OF MASTERY	5
HOUSEHOLD SIZE AND COMPOSITION	5
PARTICIPATION IN GOVERNMENT ASSISTANCE PROGRAMS	5
EVALUATION OF FIDELITY OF PROGRAM IMPLEMENTATION	7
PROGRAM ATTRITION	7
ENROLLMENT AND PROGRESSION OF PARTICIPANTS THROUGH PROGRAM	7
PROGRAM ATTRITION BY REASON	9
COMPLETED HOME VISITS DURING PREGNANCY AND INFANCY	11
NUMBER AND DURATION OF NURSE HOME VISITS	11
CONTENT OF HOME VISITS	12
PERCEIVED QUALITY OF HOME VISITATION.....	13
NURSE'S PERCEPTION OF PARTICIPANT ENGAGEMENT IN HOME VISITS.....	13
OTHER INTERACTIONS.....	14
TELEPHONE ENCOUNTER REPORTS DURING PREGNANCY.....	14
EVALUATION OF PROGRAM OUTCOMES.....	15
CHANGE IN MATERNAL HEALTH BEHAVIORS DURING PREGNANCY	15
MATERNAL CIGARETTE SMOKING	15

OTHER SUBSTANCE USE DURING PREGNANCY	15
BIRTH OUTCOMES	17
GENDER OF INFANTS	17
GESTATIONAL AGE	17
BIRTH WEIGHT	17
OTHER INDICATORS OF INFANT HEALTH	18
IMMUNIZATIONS	18
EMERGENCY ROOM VISITS AND HOSPITALIZATIONS	19
CHILDHOOD ILLNESSES	22
CHILD SAFETY	23
SUBSEQUENT PREGNANCIES.....	24
CHANGES IN WORKFORCE PARTICIPATION, MARITAL STATUS, EDUCATION, AND USE OF WELFARE	24
WORKFORCE PARTICIPATION AT PROGRAM INTAKE AND WHEN INFANTS ARE SIX AND TWELVE MONTHS OF AGE.....	25
MARITAL STATUS AND EDUCATION AT PROGRAM INTAKE AND WHEN INFANTS ARE SIX AND TWELVE MONTHS OF AGE	25
WELFARE USE WHEN INFANTS ARE SIX AND TWELVE MONTHS OF AGE.....	26
STRENGTHS AND WEAKNESSES	28
REFERENCES.....	29
APPENDIX	30
COMPARISON OF FIDELITY OF PROGRAM IMPLEMENTATION FOR WASHINGTON STATE, OKLAHOMA CITY, AND GARFIELD COUNTY.....	31
COMPARISON OF BIRTH OUTCOMES FOR WASHINGTON STATE, OKLAHOMA CITY, AND GARFIELD COUNTY	34

LIST OF TABLES

TABLE 1.	CHARACTERISTICS OF PARTICIPANTS AT PROGRAM ENTRY	6
TABLE 2.	CASELOAD ACCRUAL FOR WASHINGTON STATE PARTICIPANTS BY CURRENT STATUS	9
TABLE 3.	PARTICIPANTS WHO DROPPED DURING PREGNANCY AND INFANCY BY REASON	10
TABLE 4.	NUMBER AND DURATION OF NURSE HOME VISITS FOR PREGNANCY AND INFANCY	11
TABLE 5.	PROPORTION OF NURSE VISIT TIME ON EACH CONTENT AREA AND PROGRAM PROTOCOL FOR PREGNANCY AND INFANCY.....	13
TABLE 6.	PARTICIPANT ENGAGEMENT IN HOME VISIT FOR PREGNANCY AND INFANCY.....	14
TABLE 7.	TELEPHONE ENCOUNTERS WITH FAMILIES DURING PREGNANCY AND INFANCY.....	14
TABLE 8.	HEALTH HABITS AT PROGRAM INTAKE AND 36 WEEKS OF PREGNANCY, WASHINGTON STATE.....	16
TABLE 9.	CHANGE IN NUMBER OF CIGARETTES SMOKED PER DAY DURING PREGNANCY (AMONG THOSE WHO SMOKED 5 OR MORE CIGARETTES PER DAY AT PROGRAM ENTRY)	16
TABLE 10.	DISTRIBUTION OF WASHINGTON STATE INFANTS BY GENDER	17
TABLE 11.	GESTATIONAL AGE OF INFANT AT BIRTH.....	17
TABLE 12.	VACCINATION COMPLETION AT SIX MONTHS OF INFANT AGE.....	18
TABLE 13.	VACCINATION COMPLETION AT 12 MONTHS OF INFANT AGE.....	19
TABLE 14.	NUMBER OF INFANT EMERGENCY ROOM VISITS REPORTED AT SIX MONTHS OF AGE.....	19
TABLE 15.	INFANT EMERGENCY ROOM VISITS BY ILLNESS, INJURY, AND INGESTION AT SIX MONTHS OF AGE	20
TABLE 16.	NUMBER OF INFANT HOSPITALIZATIONS REPORTED AT SIX MONTHS OF AGE	20
TABLE 17.	INFANT HOSPITALIZATIONS BY ILLNESS, INJURY, AND INGESTION AT SIX MONTHS OF AGE	21
TABLE 18.	NUMBER OF INFANT EMERGENCY ROOM VISITS REPORTED AT 12 MONTHS OF AGE.....	21
TABLE 19.	INFANT EMERGENCY ROOM VISITS BY ILLNESS, INJURY, AND INGESTION AT 12 MONTHS OF AGE	21
TABLE 20.	NUMBER OF INFANT HOSPITALIZATIONS REPORTED AT 12 MONTHS AGE	22
TABLE 21.	INFANT HOSPITALIZATIONS BY ILLNESS, INJURY, AND INGESTION AT 12 MONTHS OF AGE	22
TABLE 22.	CHILD SAFETY AT 12 MONTHS OF AGE.....	24
TABLE 23.	PERCENTAGE OF WOMEN WITH AT LEAST ONE SUBSEQUENT PREGNANCY AT 6 AND 12 MONTHS POSTPARTUM WASHINGTON STATE AND DENVER CLINICAL TRIAL FAMILIES.....	24
TABLE 24.	CURRENTLY WORKING AT PROGRAM INTAKE, INFANT SIX AND TWELVE MONTHS OF AGE.....	25
TABLE 25.	PARTICIPANTS MARRIED AT PROGRAM INTAKE, SIX AND TWELVE MONTHS INFANT AGE.....	26
TABLE 26.	PARTICIPANTS ENROLLED IN SCHOOL AT PROGRAM INTAKE, SIX AND TWELVE MONTHS INFANT AGE	26

TABLE 27.	COMMUNITY SERVICE PROGRAMS AT PROGRAM ENTRY AND SIX AND TWELVE MONTHS INFANT AGE	27
TABLE 28.	COMPARISON OF PARTICIPANTS WHO DROPPED DURING PREGNANCY AND INFANCY BY REASON FOR WASHINGTON STATE, OKLAHOMA CITY, AND GARFIELD COUNTY.....	31
TABLE 29.	COMPARISON OF NUMBER AND DURATION OF NURSE HOME VISITS FOR PREGNANCY WASHINGTON STATE, OKLAHOMA CITY, AND GARFIELD COUNTY	32
TABLE 30.	COMPARISON OF NUMBER AND DURATION OF NURSE HOME VISITS FOR INFANCY FOR WASHINGTON STATE, OKLAHOMA CITY, AND GARFIELD COUNTY	33
TABLE 31.	COMPARISON OF PROPORTION OF NURSE VISIT TIME ON EACH CONTENT AREA AND PROGRAM PROTOCOL FOR PREGNANCY AND INFANCY FOR WASHINGTON STATE, OKLAHOMA CITY, AND GARFIELD COUNTY	33
TABLE 32.	COMPARISON OF DISTRIBUTION OF INFANTS BY GENDER FOR WASHINGTON STATE, OKLAHOMA CITY, AND GARFIELD COUNTY	34
TABLE 33.	COMPARISON OF GESTATIONAL AGE OF INFANT AT BIRTH FOR WASHINGTON STATE, OKLAHOMA CITY, AND GARFIELD COUNTY	34

LIST OF FIGURES

FIGURE 1.	ENROLLMENT FOR WASHINGTON STATE THROUGH AUGUST 31, 2001.....	8
FIGURE 2.	TOP FOUR REASONS FOR ATTRITION DURING PREGNANCY.....	10
FIGURE 3.	TOP FOUR REASONS FOR ATTRITION DURING INFANCY.....	10
FIGURE 4.	INFANT BIRTH WEIGHT IN GRAMS.....	18
FIGURE 5.	CHILDHOOD ILLNESSES AT SIX MONTHS.....	22
FIGURE 6.	CHILDHOOD ILLNESSES AT 12 MONTHS.....	23
FIGURE 7.	INFANT BIRTH WEIGHT IN GRAMS FOR WASHINGTON STATE.....	35
FIGURE 8.	INFANT BIRTH WEIGHT IN GRAMS FOR OKLAHOMA CITY.....	35
FIGURE 9.	INFANT BIRTH WEIGHT IN GRAMS FOR GARFIELD COUNTY.....	35

EXECUTIVE SUMMARY

This is the second evaluation report for the nurse home visitation program, based on the Nurse-Family Partnership program developed by David Olds and colleagues, in the state of Washington State. Presently, the Washington State program is being coordinated through the University of Washington School of Nursing and serves Chelon-Douglas Health District, Jefferson County Health District, Mason County Health District, Seattle – King County Health District and Snohomish County Health District. This report presents analysis of data available from program initiation through August 31, 2001. Since the site has been operational for about two years, the evaluation focuses on the pregnancy and infancy phases of the program. Analysis for the toddler phases could not be completed due to insufficient numbers of participants (less than 50) who have children that have reached two years of age.

The report is divided into five organizational sections. They are as follows:

- An overview of the nurse home visitation model,
- An overview of the goals of the evaluation plan and sources of data,
- Characteristics of participants at program entry,
- An analysis of program implementation in Washington State with a comparison to benchmark data from the Denver Clinical Trial, and
- An analysis of selected program outcomes with a comparison to relevant benchmark data from the Denver Clinical Trial.

PROGRAM MODEL

The program consists of nurse home visitors who work with women and their families in their homes during pregnancy and continuing through the first two years of the child's life. There are three main goals of the program:

- Improve pregnancy outcomes by helping women alter their health-related behaviors, including reducing use of cigarettes, alcohol, and illegal drugs;
- Improve child health and development by helping parents provide more responsible and competent care for their children; and
- Improve families' economic self-sufficiency by helping parents develop a vision for their own future, plan future pregnancies, continue their education and find work.

EVALUATION OF THE NURSE HOME VISITATION PROGRAM IMPLEMENTATION

The principal questions of this evaluation study focus on whether the nurse home visitation program is being implemented with fidelity to the original model and to what extent the program outcomes attained parallel the results demonstrated in the clinical trials.

Quantitative aspects of program fidelity are determined in this report by the extent to which the program has:

- Recruited and retained a population of low income, first-time mothers;
- Enrolled families early in pregnancy and followed them through the child's second birthday; and
- Conducted visits that are of comparable frequency, duration, and content as those delivered in the randomized clinical trials.

The quantitative analysis is based on information obtained through the Clinical Information System, using measures from instruments adapted from those used in the clinical trials.

RECRUITMENT AND RETENTION OF PARTICIPANTS

From program inception through August 31, 2001 the program enrolled 280 pregnant women. Women enrolled in the program were on the average 18 years of age, unmarried, and had approximately an 11th grade education. The majority of participants were Caucasian Non-Hispanic (52%). Forty two percent of participants lived with their husbands or boyfriends, 39% lived with maternal mothers, 15% lived with other family members (e.g., grandparents, aunts). Only a very small percent (4%) lived alone. The median household income was \$17,500. The average number of weeks gestation at registration into the program was 19 weeks (SD 6.91, range=3-39 weeks) for all participants.

The overall number of mothers who dropped during pregnancy was 29 (14%). The most prevalent reasons for dropping during pregnancy were declined further participation, 12 (6%) followed by moved out of area, 7 (3%), and miscarry or fetal death, 5 (2%).

The overall number of mothers who dropped during infancy was 32 (27%). The most prevalent reasons for dropping during infancy were declined participation and moved out of area, 13 (11%), followed by unable to locate client, 2 (2%); more than 180 days without a home visit, 1 (1%) each.

THE CONTENT AND PROCESS OF HOME VISITS

The process of home visits is examined by comparing the number of completed visits to the number of expected visits for each stage of the program. The ratio of completed to expected visits for the pregnancy stage (0.7) was slightly greater in Washington State than that achieved in the Denver Clinical Trial (0.6). Where as the ratio of completed to expected visits for Infancy (birth to 12 months) was slightly lower in Washington State (0.4) than in the Denver Clinical Trial (0.5).

Nurse home visitors report on what proportion of each visit is devoted to the five areas of program content: Personal Health of the Mother, Environmental Health, Mother's Life Course Development, Maternal Role, and Relationships with Family and Friends. The two most emphasized by the Washington State nurse home visitors during pregnancy were personal health (42%) and maternal role (19%). During infancy the two most emphasized were maternal role (41%) and personal health (21%).

EVALUATION OF PROGRAM OUTCOMES

In this evaluation of the program replication in Washington State, the health and well-being of the mothers and children enrolled in the program are examined according to common indicators of maternal, child, and family health. While the interpretation of such data is complicated when there is no randomly assigned control group, benchmark standards from prior randomized clinical trials conducted on the program model are used to draw inferences about how the program is working in the new sites. However, it should be noted that the inferences drawn need to be interpreted with caution as the outcome data in dissemination are based entirely upon maternal self-report as opposed to efforts made to validate outcomes in the randomized trials through observations of maternal behavior and review of medical records.

CHANGE IN MATERNAL HEALTH HABITS

Sixty-five participants responded to the Health Habits questionnaires at intake and 36 weeks of pregnancy. Thirteen participants were smokers at intake compared to 5 at 36 weeks of pregnancy, representing a (12%) decrease in the number of women who reported smoking. For those women smoking 5+ cigarettes in the last 24 hours there were 5 at intake compared to 2 at 36 weeks,

representing a small (5%) decrease. Among participants who reported smoking 10+ cigarettes in the last 24 hours there were 3 at intake and 1 at 36 weeks.

GESTATIONAL AGE AND BIRTH WEIGHT

The majority (94%) of infants were born at 37 or more weeks of pregnancy (usual length of gestation) with a mean gestational age of 39.2 weeks (SD=2.2 weeks). Nine infants (6%) were born at 36 weeks or less. The majority of infants weighed at least 2,500 grams at birth (94%). Five percent of the infants weighed between 1,500 and 2,499 grams at birth and 1% of the infants weighed less than 1,500 grams.

IMMUNIZATIONS

Immunizations can prevent disability and death caused by infectious disease and can help control the spread of infections within communities. There were 85 participants who completed the Infant Health Care Form at six months and 62 participants at twelve months. At six months, 85% (72) completed Hepatitis B, 89% (76) completed DTP/DtaP, 87% (74) completed H. Influenza type b, and 87% (74) completed Polio vaccinations. At twelve months 97% (60) completed Hepatitis B, 93% (50) completed DTP/DtaP, 93% (50) completed H. Influenza type b, and 97% (60) completed Polio vaccinations.

INFANT EMERGENCY ROOM VISITS AND HOSPITALIZATIONS

The incidence of emergency room visits and hospitalizations can serve as an indication of child illness, accidental and/or non-accidental trauma. Of the 85 participants who reported on emergency visits at infant age 6 months, 52 (61%) reported no visits, 22 (26%) reported one visit, 5 (6%) reported two visits, 2 (2%) reported three visits, and 4 (5%) reported more than three visits. The majority of emergency room visits with reasons reported were illness related. Of the 79 participants who reported on hospitalizations at six months, 72 (91%) reported no hospitalizations, 4 (5%) reported of one hospitalization, 2(3%) reported of two hospitalizations, and 1 (1%) reported more than three hospitalizations. Most hospitalizations with reason for visit reported were illness related.

Of the 51 participants who reported the number of emergency room visits at twelve months of infant age, there were 29 (57%) reported no hospitalizations, 14 (27%) reported one hospitalization, 5 (10%) reported two hospitalizations, 1 (2%) reported of three hospitalizations, and 2 (4%) reported more than three visits. Most ER visits with reason for visit reported were illness related. Of the 52 participants who reported on hospitalizations, 49 (94%) reported no visits, 2 (4%) reported one visit, and 1 (2%) reported three visits. All hospital visits were illness related.

WORKFORCE AND SCHOOL PARTICIPATION

Out of the 79 participants who reported on workforce participation at both intake and six months there was a decrease in workforce participation. Thirty five (44%) mothers reported that they worked at program intake and 30 (38%) reported that they worked when the infant was 6 months old, representing a non-significant decrease (6%) in mothers working during early infancy. Fifty-one mothers reported on workforce participation at both intake and 12 months. There was no change in workforce participation between intake and 12 months of infant age in Washington State, with 24 (47%) mothers reported that they worked at program intake and when the infant was 12 months old. In the Denver Clinical Trial workforce participation increased by 22% from program intake to 12 months infant age.

Out of the 81 participants who reported on enrollment in school at both intake and six months there was a small decrease (1%) between intake and six-months of infant age. Twenty-three (28%) mothers reported that they were enrolled in school at program intake and 22 (27%) were enrolled in school when the infant was 6 months old. Fifty-two mothers reported on school enrollment at both intake and 12 months. There was an no change in school enrollment between intake and 12 months of infant age in

Washington State, with, 11 (21%) mothers reported that they enrolled in school at program intake and when the infant was 12 months old. Similarly, there was no change in school enrollment during this time period in the Denver Clinical Trial.

USE OF COMMUNITY SUPPORT PROGRAMS

Of the 208 participants that reported the use of community services at program entry, 83% of participants were enrolled in the Women, Infants and Children (WIC) supplemental feeding program, 93% reported receiving Medicaid support, 16% reported receiving Food Stamps, and 15% reported being on TANF or welfare.

For the 85 mothers who provided information on use of community support at intake and 6 months of infant age, there was a 13% increase in the participants' use of WIC, a 6% decrease in Medicaid, a 19% increase in TANF/welfare, and a 11% non-significant increase in usage of Food Stamps. Changes in use of WIC and TANF/welfare were significant at $p < .05$. From Intake to 12 months of infant age 52 participants reported on use of community support programs. There was no change in the participants' use of WIC, a 12% decrease in the participants' use of Medicaid, a 17% increase in use of Food Stamps, and a 23% increase in the use of TANF/welfare. Changes in Food Stamps and TANF/welfare were significant at $p < .05$.

EVALUATION OF WASHINGTON STATE CONSORTIUM NURSE HOME VISIT PROGRAM

REPORT TIME SPAN:
PROGRAM INITIATION THROUGH AUGUST 31, 2001

INTRODUCTION

This is the second comprehensive evaluation report for the Washington State Consortium Nurse Home Visit Program, based on a replication of the Nurse-Family Partnership program developed and tested by Dr. David Olds and colleagues¹. Data available from program initiation through August 31, 2001 was used. The report is organized into five sections:

- An overview of the nurse home-visitation model,
- An overview of the goals of the evaluation plan and sources of data,
- Characteristics of participants at program entry,
- An analysis of program implementation in Washington State with a comparison to benchmark data from the Denver Clinical Trial,
- An analysis of program outcomes for the pregnancy and infancy phases with a comparison to benchmark data from the Denver Clinical Trial.

NURSE HOME VISITATION OVERVIEW

Federal, state and local governments and a variety of private efforts have attempted for several decades to create interventions that would prevent or at least reduce the incidence of low birth weight infants, child abuse and neglect, crime, welfare dependency and other severe social and health problems. These included several models of home visitor programs and some programs based in the social welfare system. Our society, nonetheless, still faces persistent rates of child and family poverty, births to adolescents, infant mortality, and juvenile crime. Many of these problems can be traced directly to the behavior of mothers and fathers and conditions in the family home.

One program of prenatal and infancy home visitation by nurses, however, has been developed to address many of the programmatic and clinical deficiencies found in programs tested earlier. Scientifically controlled studies of this program in Elmira, New York; Memphis, Tennessee; and Denver, Colorado have produced a variety of positive outcomes for low-income mothers and their children.¹⁻⁴ This nurse visitor program also has been shown to pay for itself with reductions in government spending by the time the children are four years old. Cost savings to government and society over the child's lifetime are at least four times greater than the cost of the program.^{5, 6}

THE PROGRAM MODEL

The program consists of nurse home visitors who work with women and their families in their homes during pregnancy and continuing through the first two years of the child's life to accomplish three goals:

- Improve pregnancy outcomes by helping women alter their health-related behaviors, including reducing use of cigarettes, alcohol, and illegal drugs;
- Improve child health and development by helping parents provide more responsible and competent care for their children; and
- Improve families' economic self-sufficiency by helping parents develop a vision for their own future, plan future pregnancies, continue their education and find work.

The model being replicated has a number of key features that differentiate it from other home visitation programs:

- A firm foundation in theories of development and behavioral change and methods to reduce specific risks for poor maternal and child outcomes,
- Focus on low-income women bearing first children,
- A clinical foundation in health,
- Use of registered nurses,
- Initiation of visits during pregnancy and continuing involvement with families for two years postpartum, and
- Use of detailed visit-by-visit protocols to guide the nurses in their work with families.

BASIC COMPONENTS OF THE EVALUATION PLAN

One of the potential pitfalls in the dissemination of any model program is that if the results the program was expected to attain are not realized in the new setting, local leaders are likely to quickly claim that the program "really does not work." All too often, however, the underlying issue may not be the lack

of effectiveness of the program, but rather a failure to implement the program as it was designed and previously tested. Thus, the principal questions of this evaluation study focus on whether the nurse home visitation program is being implemented with fidelity to the original model and to what extent the program outcomes attained parallel the results demonstrated in the clinical trials.

Quantitative aspects of program fidelity are determined in this report by the extent to which the program has (a) recruited and retained a population of low income, first-time mothers; (b) enrolled families early in pregnancy and followed them through the child's second birthday; and (c) conducted visits that are of comparable frequency, duration, and content as those delivered in the randomized clinical trials.

In the evaluation of program replication the health and well-being of the mothers and children enrolled in the program are examined according to common indicators of maternal, child, and family health: maternal health habits during pregnancy, gestational age of the infant at birth, and percent of infants who are low birth weight. While the interpretation of such data is complicated when there is no randomly assigned control group, benchmark standards from prior randomized clinical trials conducted on the program model will be used to draw inferences about how the program is working in the new sites. It should be noted that the inferences drawn need to be interpreted with caution as the outcome data in dissemination are based entirely upon maternal self-report as opposed to efforts made to validate outcomes in the randomized trials through observations of maternal behavior and review of medical records.

While the basic evaluation plan uses benchmark data drawn from the randomized clinical trials for comparative purposes, sites have expressed interest in knowing how they compare to other dissemination sites. To facilitate self-comparison among sites, selected data from Oklahoma City, Oklahoma and Garfield County, Oklahoma have been included in the Appendix. These sites were selected for comparison purposes as they also serve a relatively large proportion of Caucasian, Non-Hispanic participants and have sufficient data available for infancy.

CHARACTERISTICS OF PARTICIPANTS AT PROGRAM ENTRY

The demographic information gathered for evaluative purposes includes a variety of characteristics about the participants, other family members, and household characteristics. Information is collected on entry into the program and is updated at one week postpartum and when the infant is 6, 12, 18, and 24 months of age. The demographic information is provided by the participant who may or may not know all of the information being requested, such as household income asked of young teens living at home. This situation has resulted in missing information for selected items, which will be noted as the demographic data are presented. As of August 31, 2001, there were 280 mothers enrolled in the program with 248 responding to the demographics form at program entry. Table 1, shown on page 6, summarizes the salient characteristics of enrolled women.

AGE, EDUCATION, AND MARITAL STATUS

The median age of mothers enrolled in the Washington State program was 18 years at program entry with participant ages ranging from 13 to 34 years. The median educational level of the participants was 11 years, with years of education ranging from 0 to 15. Approximately 32% of participants had completed high school and approximately 89% of participants were unmarried.

RACIAL AND ETHNIC DESIGNATION

Table 1 also provides information on the racial and ethnic composition of the women and families enrolled in the Washington State program. The majority of participants identified themselves as

Caucasian (Non-Hispanic) (52%), followed by Hispanic (17%), African American (14%), Asian (7%), Other/Mixed Race (6%), and Native American (3%).

STATUS OF PARTICIPANTS AS FIRST-TIME MOTHERS

There were 244 participants who provided information concerning previous pregnancies and live births. Of these participants, 239 (98%) met criteria to be considered first-time mothers.

WORKFORCE PARTICIPATION AND HOUSEHOLD INCOME

The majority of participants (62%) reported they were not working at program entry. Reported household income ranged from \$1,500 to \$45,000. The median household income was \$17,500 per year.

GESTATIONAL AGE OF PARTICIPANTS AT PROGRAM ENTRY

The median gestational age of the mothers at registration in Washington State was 18 weeks, with a range from 3-39 weeks.

MATERNAL SENSE OF MASTERY

A participant's general psychological ability to cope with life's stressors was measured at program intake using the Mothers Sense of Mastery Scale. Higher scores indicate a stronger sense of mastery over life's challenges (respondents answer 7 questions, each with a possible range of 1-4). The median score for participants at program intake was 3.

HOUSEHOLD SIZE AND COMPOSITION

Table 1 also provides information on the household size and composition. The majority of participants reported that they lived in a household of three to five people (56%) with a median of 4 people. Participants reported household compositions, in order, living with her husband or boyfriend (42%), living with her mother (39%), living with others (15%), and living alone (4%).

PARTICIPATION IN GOVERNMENT ASSISTANCE PROGRAMS

Government assistance programs are available to participants, based upon state and federal eligibility guidelines. Government assistance programs reported are Women, Infants, and Children (WIC) Supplemental Feeding Program, Medicaid, Food Stamps, and cash assistance provided through Temporary Aid to Needy Families (TANF).

Table 1 shows the participation of Washington State participants in government-assistance programs at program entry. More than three-quarters (83%) of the participants reported use of WIC, 93% reported use of Medicaid followed by food stamps (16%), and TANF (15%).

Table 1. Characteristics of Participants at Program Entry

Characteristic	Washington State Participants	Denver Clinical Trial Participants
Number Enrolled	280	235
Maternal Age (median)	18	19
Maternal Education (median)	11	11
Annual Household Income (median)	\$17,500	\$10,500
Number in household (median)	4	3
Mastery (median)	3.0	3.1
Gestational Age (weeks) – Intake (median)	18	22
% Completed High School	32%	49%
% Unmarried	89%	86%
% Unemployed	62%	64%
Race/Ethnicity		
% Hispanic	17%	43%
% Native American	3%	2%
% African American/Black	14%	16%
% Non-Hispanic White	52%	37%
% Mixed/Other	6%	N/A
% Asian	7%	1%
Household Composition		
% Lives Alone	4%	N/A
% Lives With Husband/Boyfriend	42%	N/A
% Lives With Mother	39%	N/A
% Lives With Others	15%	N/A
Use of Government Assistance		
% WIC	83%	N/A
% Medicaid	93%	N/A
% Food Stamps	16%	N/A
% TANF	15%	N/A

N/A: Not applicable.

EVALUATION OF FIDELITY OF PROGRAM IMPLEMENTATION

A critical feature of this evaluation has to do with whether the program is being conducted with fidelity to the model on which it is based. Quantitative data from the “Home Visit Encounter Form” and “Client Activity Status Form” are employed to address this issue. The analysis of fidelity is considered from the following standpoints:

- the percentage of families who drop out of the program early for various reasons,
- the quantity of the program received by participants (frequency and duration of visits),
- participant engagement in the visits as rated by nurses, and
- the content of visitation (i.e., the amount of time nurses spend on various content domains covered in the guidelines as the nurses did in the randomized trials).

PROGRAM ATTRITION

ENROLLMENT AND PROGRESSION OF PARTICIPANTS THROUGH PROGRAM

Figure 1, illustrated on page 8, shows the flow of participants through various phases of the program. At the top of the figure we see that Washington State had enrolled 280 clients through August 31, 2001. These are divided into 48 clients who are still pregnant, 207 clients who have (or should have according to their expected date of delivery) completed the pregnancy phase, and 25 clients who could not be classified as pregnant or completed pregnancy. Of the 207 participants who have (or should have according to their expected dates of delivery) completed pregnancy, 29 dropped from the program prior to the delivery of the infant.

Following the figure from pregnancy, we see that of the 87 participants with infants less than 12 months, 14 have dropped from the program, leaving 57 active program participants with infants under 12 months. An additional 16 participants who should have infants less than 12 months dropped from the program during pregnancy. Of the 120 participants who have or should have infants 12 months of age, 13 participants had dropped from the program previously during pregnancy and 32 participants dropped during infancy leaving 75 active program participants with infants 12 months of age or older.

Following the figure from infancy completed we see that 120 participants have or should have infants less than 24 months. Eleven dropped from the program during toddlerhood, 32 dropped previously during infancy, and 13 dropped previously during pregnancy, leaving 64 active program participants with infants less than 24 months.

Figure 1. Enrollment for Washington State through August 31, 2001

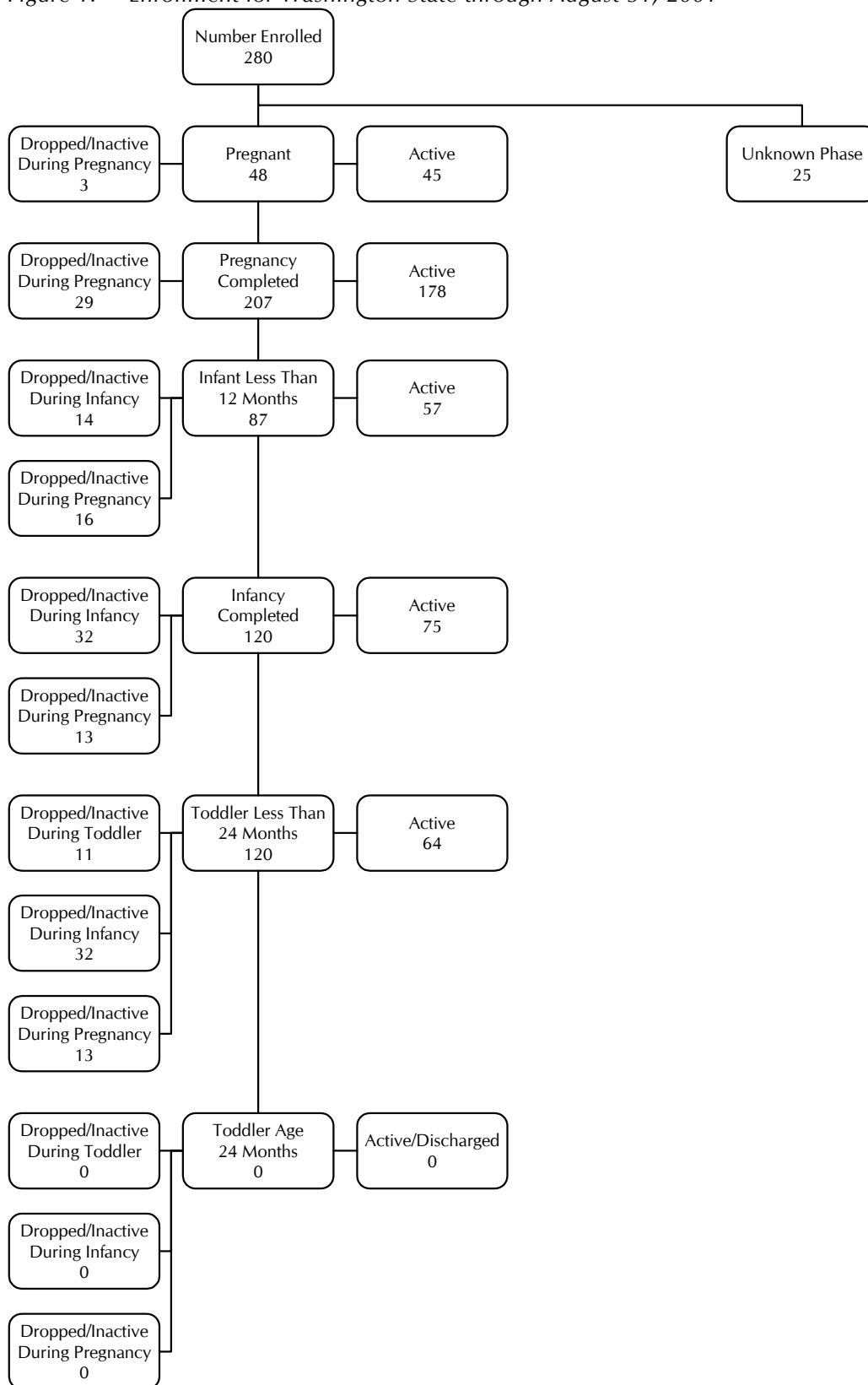


Table 2 further shows accrual of participants by year and whether they are currently active (not dropped) or dropped from the program. Of the 77 participants enrolled in 1999, 53% are currently active; of the 124 participants enrolled in 2000, 56% are currently active; of the 79 participants enrolled in 2001, 87% are currently active. As of August 31, 2001 no participants have completed the program.

Table 2. *Caseload Accrual for Washington State Participants by Current Status*

Status	1999	2000	2001	Total
Active	41	69	69	179
Attrition	36	55	10	101
Total	77	124	79	280
Percent Active	53%	56%	87%	64%

PROGRAM ATTRITION BY REASON

The reasons recorded by nurses for participants having dropped out of the program early include:

- Declined further participation
- Excessive missed appointments
- Unable to locate
- Moved out of service area
- Had miscarriage or fetal/early death
- Maternal death
- Parental rights severed by court order/Child no longer in family's custody
- Program unable to provide clients services

Using these categories the numbers of participants who completed (or should have completed) pregnancy/infancy and dropped during pregnancy/infancy were analyzed. As this report evaluates program attrition before the full intervention has been completed, we should interpret the attrition data with caution.

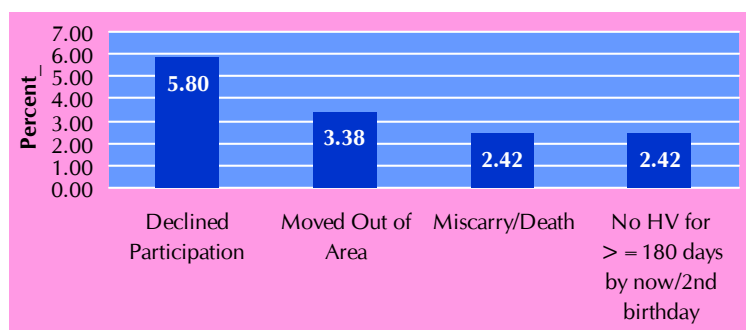
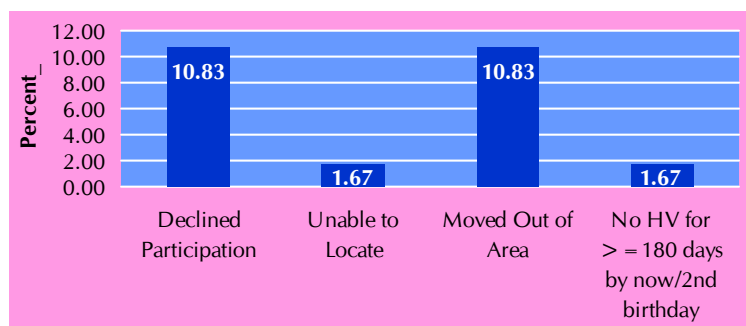
Table 3 shows that for the 207 mothers who have completed pregnancy, 29 (14%) dropped from the program prior to the delivery of their infant. The most common reasons for dropping during pregnancy were declined further participation, 12 (6%) and moved out of the service area, 7 (3%). It should be noted that of all of the categories for dropping, it is 'declined participation', 'unable to locate', and 'excessive missed appointments' that are potentially amenable to intervention. A total of 12 participants (6%) dropped for these three reasons. The other reasons for early program drops, 'moved out of state/program area', and 'miscarriage/fetal death', relate to reasons external to the program, with nurse home visitors having limited influence over these causes of attrition. The data are also checked for participants who have not received a home visit within 180 days. If participants have not received a home visit within 180 days they are considered to have dropped from the program, 5 (2%).

Also, as illustrated in Table 3, of the 120 participants who have infants at least 12 months of age, 32 (27%) participants dropped from the program prior to their infants' first birthday. The birth of a healthy infant increases a family's ability to move. The substantial 13% of families during infancy declining continued participation in the program, failing to keep home visits, or whom home visitors could not locate requires staffs' further attention as these causes of attrition are potentially modifiable.

Table 3. *Participants Who Dropped during Pregnancy and Infancy by Reason*

Reason for Drop	Pregnancy (N = 207)		Infancy (N = 120)	
	Frequency	Percent	Frequency	Percent
Declined further participation	12	5.80	13	10.83
Excessive missed appointments	0	0.00	1	0.83
Unable to locate	0	0.00	2	1.67
Moved out of service area	7	3.38	13	10.83
Miscarry/fetal death	5	2.42	1	0.83
Child not in custody	0	0.00	0	0.00
No home visits for ≥ 180 days	5	2.42	2	1.67
Total	29	14.01	32	26.67

The top four reasons for leaving the program during pregnancy were declined participation, moved out of service area, miscarriage/fetal death, and no home visits for greater than 180 days (see Figure 2). During infancy the top four reasons for leaving the program were declined participation, moved out of area, unable to locate, and no home visits for greater than 180 days (see Figure 3).

Figure 2. *Top Four Reasons for Attrition during Pregnancy*
(N = 207)Figure 3. *Top Four Reasons for Attrition during Infancy*
(N = 120)

COMPLETED HOME VISITS DURING PREGNANCY AND INFANCY

NUMBER AND DURATION OF NURSE HOME VISITS

Table 4 provides information regarding the process of nurse home visits during pregnancy. Following the method used in the randomized trials, the computations of the average completed visits per participant, the overall completed to expected visit ratio, and the average visit length were based on all participants who have completed the pregnancy phase (N=207), including those who dropped prior to the delivery of their infants. As illustrated, home visitors completed on average approximately eight visits per mother, with a ratio of 0.7 completed to expected visits. The average visit length was 82 minutes (1 hour, 22 minutes) and the average total contact time was 626 minutes (10 hours, 26 minutes) for each mother. Compared to data for the Denver Clinical Trial, the average number of completed visits per participant was higher (7.7 vs. 6.5), the completed to expected ratio was slightly higher (0.7 vs. 0.6), the average visit length was longer (82 minutes vs. 77 minutes), and the total contact time was longer (626 minutes vs. 502 minutes).

Table 4 also provides information regarding the process of nurse home visits during infancy. For the 120 participants who have (or should have) completed infancy, home visitors completed an average of 12 visits per mother, with a ratio of 0.4 completed to expected visits. The average visit length was 74 minutes (1 hour, 14 minutes) with an average total contact time of 921 minutes (15 hours, 21 minutes) for each mother. Compared to data from the Denver Clinical Trial, the average number of visits was smaller (12 vs. 13), the completed to expected ratio was slightly smaller (0.4 vs. 0.5), the average visit length was comparable (74 minutes vs. 71 minutes), and the total contact time was similar (921 minutes vs. 941 minutes).

Table 4. Number and Duration of Nurse Home Visits for Pregnancy and Infancy

Phase		Every Child Succeeds Families			Denver Clinical Trial Families		
		Number	Average	Standard Deviation	Number	Average	Standard Deviation
Pregnancy	Pregnancy Completed	207	N/A	N/A	235	N/A	N/A
	Completed Visits	1585	7.7	4.3	1521	6.5	3.8
	Expected Visits	2418	N/A	N/A	2728	N/A	N/A
	Completed/Expected Ratio	N/A	0.7	0.3	N/A	0.6	0.3
	Average Visit Length (Minutes)	N/A	82.0	19.9	N/A	77.0	15.8
	Average Total Contact Time (Minutes)	N/A	626	378	N/A	502	322
Infancy	Infancy Completed	120	N/A	N/A	235	N/A	N/A
	Completed Visits	1470	12.3	8.6	3061	13.0	8.2
	Expected Visits	3338	N/A	N/A	6525	N/A	N/A
	Completed/Expected Ratio	N/A	0.4	0.3	N/A	0.5	0.3
	Average Visit Length (Minutes)	N/A	73.9	13.8	N/A	71.3	12.9
	Average Total Contact Time (Minutes)	N/A	921	689	N/A	940.6	634.3

N/A: Not applicable.

CONTENT OF HOME VISITS

The content of the home visitation program is based upon the visit-by-visit guidelines that are designed to promote five domains of maternal, child, and family functioning. The specific content and emphasis given to these five domains varies depending on the developmental stages and challenges most families encounter during pregnancy, infancy (0 to 12 months) and toddlerhood (13 to 24 months). The actual focus of each home visit is based on detailed guidelines and is agreed upon by the mother and nurse home visitor at the preceding visit to allow for individualization related to the mothers' and family members' needs. These five domains of (program content areas) are:

- Personal health of the mother,
- Environmental health,
- Mother's life-course development,
- Maternal role, and
- Relationships with friends and family.

After each home visit, the nurse visitors are asked to make a judgment about what percentage of that visit was spent on each of the five program content areas, summing to 100 percent for all five domains. In addition, they are asked to note what percentage of the planned material to be covered for each home visit was accomplished, also based on 100 percent.

During pregnancy, one might expect the nurse home visitor to emphasize the health of the mother and the development of the maternal role. The average percentage of time spent on each of the five domains and the proportion of the planned material covered for the pregnancy phase by home visitors in Washington State are noted in Table 5. While all program content domains were included in visits, the two receiving the most emphasis were the mothers' personal health (42%) and development of her maternal role (19%). When the proportion of time spent on each program content area for families in Washington State is compared to that observed for families in the Denver Clinical Trial, slightly more time is spent on Personal Health (42% vs. 38%) and less time is spent on Maternal Role (19% vs. 25%).

During infancy, the emphasis shifts from a focus on the mother to include a greater focus on the infant. It is during this phase that the nurse home visitor emphasizes the developing maternal role, while also covering environmental health and life-course development with greater emphasis. The average percentage of time spent on each of the five domains and the proportion of the planned material covered for the pregnancy phase by home visitors in Washington State are noted in Table 5. While all program content domains were included in visits, the two receiving the most emphasis were the development of her maternal role (41%) and mothers' personal health (21%). During infancy, Washington home visitors have spent more time on personal health (21% vs. 16%) and less time on maternal role (41% vs. 48%) than the Denver Clinical Trial home visitors.

Table 5. *Proportion of Nurse Visit Time on Each Content Area and Program Protocol for Pregnancy and Infancy*

Program Content Areas and Protocol	Washington State		Denver Clinical Trial Families	
	Percent Time	Standard Deviation	Percent Time	Standard Deviation
Pregnancy	(N = 207)		(N = 235)	
Personal Health	42.3	11.7	38.4	12.0
Environmental Health	11.1	8.2	7.2	5.2
Life-course Development	11.8	7.0	13.8	7.5
Maternal Role	18.7	8.0	25.0	11.4
Friends & Family	15.6	6.4	15.4	6.2
Program Protocol	86.7	11.9	87.8	12.0
Infancy	(N = 120)		(N = 235)	
Personal Health	20.8	10.3	15.8	6.9
Environmental Health	9.0	5.0	7.3	5.2
Life-course Development	14.2	7.3	14.5	6.3
Maternal Role	40.6	9.3	48.2	12.9
Friends & Family	14.9	4.7	14.2	6.1
Program Protocol	89.9	8.1	87.0	10.6

PERCEIVED QUALITY OF HOME VISITATION

The development of a relationship between the nurse home visitor and the mothers in his or her caseload is a critical feature of program implementation. To examine the mothers' participation in this relationship, the home visitors report the mothers' level of engagement in the program process after each home visit.

NURSE'S PERCEPTION OF PARTICIPANT ENGAGEMENT IN HOME VISITS

Participant engagement in the home visit is measured along four dimensions. They include:

- Maternal involvement in the program,
- Maternal problem-solving,
- Maternal conflict with materials used in the home visit, and
- Maternal understanding of material used.

These four dimensions of engagement are rated by the nurse home visitors on a scale of 1 (low) to 5 (high) after each home visit. Table 6 shows the scores for maternal involvement, maternal problem solving, conflict with nurse home visit material and understanding of program materials during pregnancy and infancy. During both pregnancy and infancy nurse home visitors in Washington State gave higher ratings to the four dimensions of engagement than did home visitors in the Denver Clinical Trial.

From pregnancy to infancy engagement indicators of the participants was nearly unchanged.

Table 6. *Participant Engagement in Home Visit for Pregnancy and Infancy*

Engagement Indicators	Washington State		Denver Clinical Trial Families	
	Average Score	Std. Dev. (SD)	Average Score	Std. Dev. (SD)
Pregnancy	(N = 207)		(N = 235)	
Maternal Involvement	4.3	0.7	3.5	0.6
Maternal Problem-Solving	3.6	0.9	2.6	0.7
Maternal Conflict with Home Visit Material	1.5	0.7	1.4	0.6
Maternal Understanding of Material	4.3	0.7	3.1	0.8
Infancy	(N = 120)		(N = 235)	
Maternal Involvement	4.3	0.7	3.5	0.5
Maternal Problem-Solving	3.7	0.9	2.8	0.6
Maternal Conflict with Home Visit Material	1.4	0.6	1.2	0.4
Maternal Understanding of Material	4.4	0.7	3.1	0.9

OTHER INTERACTIONS

TELEPHONE ENCOUNTER REPORTS DURING PREGNANCY

Nurse home visitors report information on all encounters with mothers and families. Although the most frequent encounter is through home visit, there are times when telephone contacts occur.

Table 7 shows the telephone encounters recorded for the 207 participants who completed the pregnancy phase of the program. Of the 207 participants, 73 percent did not have a telephone encounter during pregnancy. For the 56 participants who had telephone encounters, the average number of telephone encounters during pregnancy was 3, with a range of 1 to 10. The average length of a call was approximately 10 minutes, with the majority of the time spent during calls focusing on the personal health of the mother (52%) and maternal role (13%).

Table 7 also shows the telephone encounters recorded for the 120 participants who completed the infancy phase of the program. Of the 120 participants, 69 percent did not have a telephone encounter during infancy. For the 37 participants who had telephone encounters, the average number of telephone encounters during infancy was 4, with a range of 1 to 18. The average length of a call was approximately 10 minutes, with the majority of the time spent during calls focusing on maternal role (30%) and personal health (27%).

Table 7. *Telephone Encounters with Families during Pregnancy and Infancy*

Phase	Total number of telephone encounters	Mean number of telephone encounters per person	Standard Deviation	Minimum	Maximum
Pregnancy (N = 56)	159	2.84	2.15	1	10
Infancy (N = 37)	146	3.95	4.24	1	18

EVALUATION OF PROGRAM OUTCOMES

An important part of this evaluation consists of monitoring the health and well-being of the mothers and children enrolled in the program. As noted earlier, the interpretation of these data is complicated when there is no randomly assigned control group with which to compare maternal, child, and family functioning. Thus, where possible, data from the program site has been compared to benchmark data from the Denver Clinical Trial. It should be noted, however that data collected in Washington State is based entirely upon maternal report, which for selected outcomes may be over or under estimated by mothers. Missing data may reflect that the nurse home visitor did not complete the record keeping forms as planned or had disrupted contact (multiple missed home visits) with the family when the data were due for collection.

CHANGE IN MATERNAL HEALTH BEHAVIORS DURING PREGNANCY

An important aspect of prenatal care is to assess and improve the health status of the pregnant women and their daily habits that can influence their health and the health and well-being of their unborn baby. An assessment of personal health habits, including smoking and the use of alcohol, drugs and other substances is done as part of Washington State. These assessments are done twice, shortly after entry into the program and at 36 weeks of pregnancy. Because health habits are measured at two different time periods during pregnancy, it is possible to consider changes in these behaviors as intervening outcomes. Of the 173 participants who should have completed the maternal health habit form at intake and 36 weeks, data are available for approximately 63-65 participants.

Two types of change are reported. Absolute change is the simple difference in percent of participants with a particular health behavior between intake and 36 weeks of pregnancy. The relative change is the absolute divided by the percent of participants with a particular health habit at intake. Both percentages quantify the amount of change however, the former simply describes the change in prevalence and the later emphasizes the extent to which the program has changed participants' health behavior. The statistical test examines whether the observed absolute difference is simply due to chance. One should also bear in mind that the interpretation of change depends on the amount of participants with a particular health behavior. If a health habit is too infrequent at intake it is usually not a viable outcome for evaluating the program effect on that health habit.

MATERNAL CIGARETTE SMOKING

To assure question clarity for the participant and consistency in analysis, the assessment of maternal smoking was based upon the question that asks if the participant has smoked in the last 48 hours. If half the number of cigarettes smoked is more than zero, the participant is designated to be a cigarette smoker in the last 24 hours, and if the number of cigarettes smoked is zero the participant is designated to be a non-smoker in the last 24 hours. The response at intake is compared to the response at 36 weeks of pregnancy for each participant to test whether there has been a significant change in the number and percentage of participants who have been smoking cigarettes in the last 24 hours.

OTHER SUBSTANCE USE DURING PREGNANCY

Similar steps are taken for use of alcohol, marijuana, cocaine, inhalants and street drugs. Whether a participant has used alcohol/drugs or not during the past 14 days is determined using a question that asks how many different days alcohol/drugs was used over the past 14 days. If a participant responds that she used alcohol/drugs over the past 14 days on one day or more, then she is defined as a drinker or drug user and if the participant responds with zero days, then she is defined as a non-drinker or non-drug user. The number and percent of drinkers and drug users at intake is then compared with the

number and percent of drinkers and drug users at 36 weeks of pregnancy to examine whether there has been a significant change in the number and percentage of alcohol or drug users from intake to 36 weeks of pregnancy.

Table 8 shows detailed information about maternal health habits at intake and 36 weeks of pregnancy for Washington participants for those with information at both time intervals. As previously noted, 207 program participants have (or should have) completed the pregnancy phase, and data should be available on health habit for the two time intervals for 173 participants. However, 63-65 participants reported on health habits at intake and 36 weeks of pregnancy. Thirteen participants were smokers at intake and 5 were smokers at 36 weeks of pregnancy, representing a statistically significant decrease in absolute percent, 12%, in the number of women who reported smoking throughout their pregnancy. For those women smoking 5+ cigarettes in the last 24 hours there were 5 at intake compared to 2 at 36 weeks, representing a small non-significant decrease in absolute percent, 5%. Among participants who reported smoking 10+ cigarettes in the last 24 hours, there were 3 at intake compared to 1 at 36 weeks, representing a small non-significant decrease in absolute percent, 3%. No change in marijuana use nor alcohol consumption between intake and 36 weeks pregnancy was observed. Caution should be taken when interpreting these data due to the limited amount of data available.

Table 8. *Health Habits at Program Intake and 36 Weeks of Pregnancy, Washington State*

Health Habits, Washington State	Program Intake		36 Weeks of Pregnancy		Change			**Frequency Missing	Number
	Frequency	Percentage	Frequency	Percentage	Frequency	Relative Percent	Absolute Percent		
Cigarette Smoker Last 24 Hours	13	20.0	5	7.7	-8	-61.5	-12.3*	108	173
Smoked 5+ Cigarettes Last 24 Hours	5	7.7	2	3.1	-3	-60.0	-4.6	108	173
Smoked 10+ Cigarettes Last 24 Hours	3	4.6	1	1.5	-2	-66.7	-3.1	108	173
Marijuana Smoker Last 14 Days	1	1.6	1	1.6	0	0.0	0.0	109	173
Used Alcohol Last 14 days	2	3.2	2	3.2	0	0.0	0.0	110	173

*Statistically significant at $P < .05$

* Frequency missing at intake and/or 36 weeks pregnancy

As illustrated in Table 9, the 5 clients who smoked 5+ cigarettes per day at intake on average reduced the amount of cigarette use by approximately 8 cigarette per day, a difference that is marginally statistically significant. The reduction in the number of cigarettes smoked per day among moderate smokers in Washington State was more than that observed in the Denver clinical trial.

Table 9. *Change in Number of Cigarettes Smoked per Day during Pregnancy (Among Those Who Smoked 5 or More Cigarettes Per Day at Program Entry)*

Site	Number of Participants	Mean Reduction	Standard Deviation	Frequency Missing	Total Observations
Washington State	5	8.4	7.6	6	11
Denver Clinical Trial	17	3.4*	4.8	0	17

*: Statistically significant at ($p = 0.0697$)

BIRTH OUTCOMES

GENDER OF INFANTS

Table 10 shows the distribution of births by gender to program participants in Washington State, with 49% females and 51% males.

Table 10. *Distribution of Washington State Infants by Gender*

Gender	Washington State Infants (N = 175)				Denver Clinical Trial Infants (N = 235)			
	Frequency	Percent	Cumulative Frequency	Cumulative Percent	Frequency	Percent	Cumulative Frequency	Cumulative Percent
Male	82	51.3	82	51.3	104	49.5	104	49.5
Female	78	48.8	160	100	106	50.5	210	100
Frequency Missing = 15					Frequency Missing = 25			

GESTATIONAL AGE

Birth before 37 weeks gestation is one common definition of prematurity with births at 28 or less weeks gestation indicating severe prematurity. As illustrated in Table 11, the majority of infants (94%) were born at 37 or more weeks of gestation, with a mean gestational age of 39.2 weeks (SD=2.2 weeks). Nine infants (6%) were born at 36 weeks or less. Compared to data for the Denver Clinical Trial, the percentage of infants born prematurely to participants in the Washington State program was lower (6% vs. 11%).

Table 11. *Gestational Age of Infant at Birth*

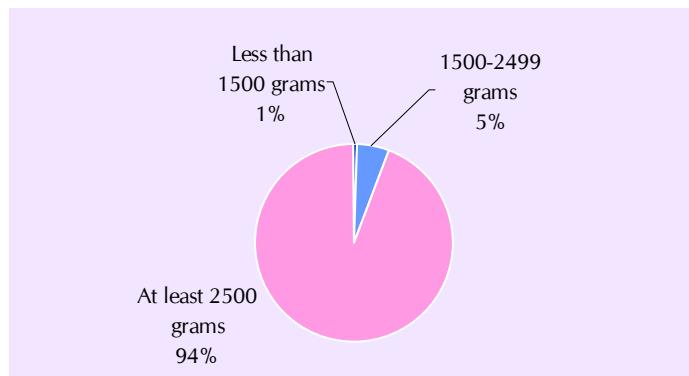
Gestational Age	Washington State Infants (N = 175)				Denver Clinical Trial Infants (N = 235)			
	Frequency	Percent	Cumulative Frequency	Cumulative Percent	Frequency	Percent	Cumulative Frequency	Cumulative Percent
28 weeks or less	1	0.7	1	0.7	2	0.9	2	0.9
29 - 36 weeks	8	5.3	9	5.9	21	9.7	23	10.6
37 - 40 weeks	110	72.9	119	78.8	147	67.7	170	78.3
Greater than 40 weeks	32	21.2	151	100.0	47	21.7	217	100.0
Frequency Missing = 24					Frequency Missing = 18			

BIRTH WEIGHT

Birth weight is used as an indicator of infant health, with the occurrence of infant death and/or handicap highly correlated with low birth weight (less than 2,500 grams). Figure 4 shows the birth weight distribution for infants in grams. The majority of infants weighed at least 2,500 grams at birth (94%) indicating that they were in the normal range for birth weight and are at less risk for future developmental delays than those infants of low birth weight. Five percent of the infants weighed between 1,500 and 2,499 grams at birth and 1% of the infants weighed less than 1,500 grams. An

infant weighing 2,500 grams is equivalent to five and one-half pounds and 1,500 grams is equivalent to 3.3 pounds. Compared to data for the Denver Clinical Trial, the percentage of low birth weight infants born to participants in the Washington State program was lower, 8% vs. 6%.

Figure 4. *Infant Birth Weight in Grams*
(N = 175)



Frequency Missing = 21

OTHER INDICATORS OF INFANT HEALTH

IMMUNIZATIONS

Infant immunization schedules, as published by the Center for Disease Control for 1999, provide the standard of care. At the time of program implementation in Washington State, four vaccines were recommended during the first year of life: Hepatitis B, DTP/DTaP (Diphtheria, Tetanus, and Pertussis or Diphtheria, Tetanus and Acellular Pertussis), H. influenzae type b, and Polio. At six months, immunization is considered complete if the infant has had two Hepatitis B, DTP/DTaP, and two H. influenzae type b and Polio vaccinations. Of the 85 participants who provided information about vaccination at 6 months, 85% (72) completed Hepatitis B, 89% (76) completed DTP/DtaP, 87% (74) completed H. Influenza type b, and 87% (74) completed Polio vaccinations.

Table 12. *Vaccination Completion at Six Months of Infant Age*
(N = 108)

Vaccine completion at 6 months of age	Completed Vaccine	Percentage Completed	Missing
Hepatitis B	72	84.71	23
DTP/DtaP	76	89.41	23
H. Influenza type b	74	87.06	23
Polio	74	87.06	23

At 12 months, immunizations are considered completed if the infant has had three DTP/DTaP and HIB vaccinations and two Hepatitis B and Polio vaccinations. Table 13 shows that for the 54 - 62 infants for whom immunizations were reported at 12 months of life, the completion rates for Hepatitis B and Polio were 97% and DTP/DtaP and H. Influenza type b were 93%.

Table 13. Vaccination Completion at 12 Months of Infant Age
(N = 67)

Vaccine completion at 12 months of age	Completed Vaccine	Percentage Completed	Missing
Hepatitis B	60	96.77	5
DTP/DtaP	50	92.59	13
H. Influenza type b	50	92.59	13
Polio	60	96.77	5

EMERGENCY ROOM VISITS AND HOSPITALIZATIONS

The incidence of emergency room visits and hospitalizations can serve as an indication of child illness, accidental and/or non-accidental trauma. Table 14 describes the frequency of ER visits reported at six months. Of the 85 participants who reported on emergency visits, 52 (61%) reported no visits, 22 (26%) reported one visit, 5 (6%) reported two visits, 2 (2%) reported three visits, and 4 (5%) reported more than three visits. Compared to data from the Denver Clinical Trial, the rates of ER visits in Washington State are lower. However, in the Denver Clinical Trial, medical records were used to gather information about the emergency room and hospital visits, regardless of whether the mother was still participating in the trial or not. In Washington State, emergency room and hospitalization information is only collected from mothers who are still participating in the program. It is plausible that the Washington State rates of use of emergency room for young infants would be greater if data for all families (continuing participants and early dropouts) were available.

Table 14. Number of Infant Emergency Room Visits Reported at Six Months of Age

	Washington State Infants (N = 108)				Denver Clinical Trial Infants (N = 235)			
	Frequency	Percent	Cumulative Frequency	Cumulative Percent	Frequency	Percent	Cumulative Frequency	Cumulative Percent
Number of Visits								
Zero Visits	52	61.2	52	61.2	90	50.6	90	50.6
One Visit	22	25.9	74	87.1	47	26.4	137	77.0
Two Visits	5	5.9	79	92.9	27	15.2	164	92.1
Three Visits	2	2.4	81	95.3	8	4.5	172	96.6
Greater than Three Visits	4	4.7	85	100.0	6	3.4	178	100.0

Frequency Missing = 23

Frequency Missing = 57

The nature of emergency room visits at six months is shown in Table 15, describing illness, injury, ingestion. Information on the reason for the emergency room visit was not reported for all visits. Of the 52 emergency room visits for which there was information, the majority were illness related.

Table 15. Infant Emergency Room Visits by Illness, Injury, and Ingestion at Six Months of Age

Nature of ER Visit	Visit One (N = 33)		Visit Two (N = 11)		Visit Three (N = 6)		Greater than Three Visits (N = 6)	
	Frequency	Percentage	Frequency	Percentage	Frequency	Percentage	Frequency	Percentage
Illness	28	93.33	10	90.91	5	83.33	4	80.00
Injury	2.	6.67	1	9.09	1	16.67	1	20.00
Ingestion	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Total	30	100.00	11	100.00	6	100.00	5	100.00
	Missing = 3		Missing = 0		Missing = 0		Missing = 0	

Table 16 shows that of the 79 participants who reported on hospitalizations at six months, there were 72 (91%) reports of no hospitalizations, 4 (5%) reports of one hospitalization, 2 (3%) report of two hospitalizations, and 1 (1%) report of more than three hospitalizations. The percentage of Washington State' infants with no hospitalizations was similar to that observed in the Denver Clinical Trial (91% vs. 89%).

Table 16. Number of Infant Hospitalizations Reported at Six Months of Age

Number of Hospitalizations	Washington State Infants (N = 108)				Denver Clinical Trial Families (N = 235)			
	Frequency	Percent	Cumulative Frequency	Cumulative Percent	Frequency	Percent	Cumulative Frequency	Cumulative Percent
Zero Hospitalizations	72	91.1	72	91.14	156	88.6	156	88.6
One Hospitalization	4	5.1	76	96.20	20	11.4	176	100.0
Two Hospitalizations	2	2.5	78	98.73	N/A	N/A	N/A	N/A
Three Hospitalizations	0	0	0	0	N/A	N/A	N/A	N/A
Greater than three Hospitalizations	1	1.27	79	100.0	N/A	N/A	N/A	N/A
	Frequency Missing = 29				Frequency Missing = 59			

The nature of hospital visits at six months is shown in Table 17, describing illness, injury, ingestion. Information on the reason for the hospital visits was not reported for all visits. Of the 9 hospital visits for which there was information, most were illness related.

Table 17. *Infant Hospitalizations by Illness, Injury, and Ingestion at Six Months of Age*

Nature of Hospital Visit	Visit One (N = 7)		Visit Two (N = 3)		Visit Three (N = 1)		Greater than Three Visits (N = 1)	
	Frequency	Percentage	Frequency	Percentage	Frequency	Percentage	Frequency	Percentage
Illness	5	83.33	2	100.00	1	100.00	N/A	N/A
Injury	1	16.67	N/A	N/A	N/A	N/A	N/A	N/A
Ingestion	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Total	6	100.00	2	100.00	1	100.00	N/A	N/A
		Missing = 1			Missing = 1			Missing = 0
								Missing = 1

Table 18 describes the frequency of emergency room visits reported at 12 months. Of the 51 participants who reported the number of emergency room visits, there were 29 (57%) that reported no visits, 14 (27%) that reported one visit, 5 (10%) that reported two visits, 1 (2%) that reported three visits, and 2 (4%) that reported more than three visits. Comparative data at 12 months of infant age from the Denver Clinical Trial are not available.

Table 18. *Number of Infant Emergency Room Visits Reported at 12 Months of Age (N = 67)*

Number of ER Visits	Frequency	Percentage	Cumulative Frequency	Cumulative Percentage
Zero Visits	29	56.86	29	56.86
One Visit	14	27.45	43	84.31
Two Visits	5	9.80	48	94.12
Three Visits	1	1.96	49	96.08
Greater than Three Visits	2	3.92	51	100.00

Frequency Missing = 16

The nature of emergency room visits at 12 months is shown in Table 19, describing illness, injury, and ingestion. Information on reason for emergency room visit was not reported for all visits. The majority of emergency room visits with reason for visit reported was illness related.

Table 19. *Infant Emergency Room Visits by Illness, Injury, and Ingestion at 12 Months of Age*

Nature of ER Visit	Visit One (N = 22)		Visit Two (N = 8)		Visit Three (N = 3)		Greater than Three Visits (N = 2)	
	Frequency	Percentage	Frequency	Percentage	Frequency	Percentage	Frequency	Percentage
Illness	17	85.00	7	100.00	2	100.00	2	100.00
Injury	2	10.00	N/A	N/A	N/A	N/A	N/A	N/A
Ingestion	1	5.00	N/A	N/A	N/A	N/A	N/A	N/A
Total	20	100.00	7	100.00	2	100.00	2	100.00
		Missing = 2			Missing = 1			Missing = 0

Table 20 shows the hospitalizations at 12 months. Of the 52 participants who reported on hospitalizations, 49 (94%) reported no visits, 2 (4%) reported one visit, and 1 (2%) reported three visits.

Table 20. *Number of Infant Hospitalizations Reported at 12 Months Age*
(N = 67)

Number of Hospitalizations	Frequency	Percentage	Cumulative Frequency	Cumulative Percentage
Zero Visits	49	94.23	49	94.23
One Visit	2	3.85	51	98.08
Two Visits	0	0.00	51	98.08
Three Visit	1	1.92	52	100.00

Frequency Missing = 15

The nature of hospital visits at 12 months is shown in Table 21, describing illness, injury, ingestion. Of the 5 hospital visits, all were illness related.

Table 21. *Infant Hospitalizations by Illness, Injury, and Ingestion at 12 Months of Age*

Nature of Hospital Visit	Visit One (N = 3)		Visit Two (N = 1)		Visit Three (N = 1)		Greater than Three Visits (N = 0)	
	Frequency	Percentage	Frequency	Percentage	Frequency	Percentage	Frequency	Percentage
Illness	3	100.00	1	100.00	1	100.00	N/A	N/A
Injury	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Ingestion	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Total	3	100.00	1	100.00	1	100.00	N/A	N/A

Missing = 0

Missing = 0

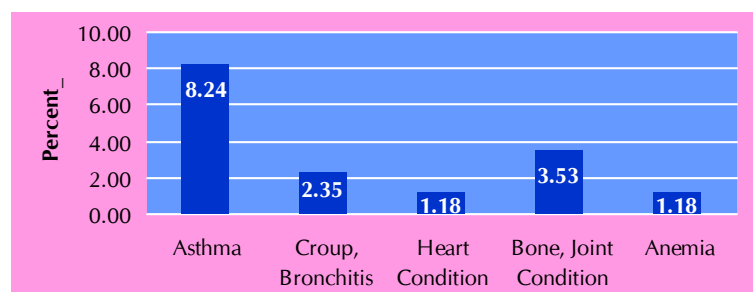
Missing = 0

Missing = N/A

CHILDHOOD ILLNESSES

Figure 5 shows that the prevailing health problem for infants between birth and six months of age was respiratory in nature with 8% reporting a diagnosis of asthma, 4% reporting a diagnosis of bone or joint conditions, 2% reporting had a diagnosis of croup and/or bronchitis, 1% reporting a diagnosis of Heart Condition, and 1% reporting a diagnosis of Anemia.

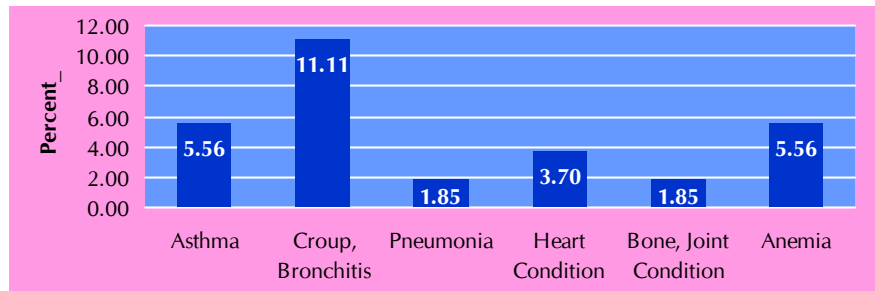
Figure 5. *Childhood Illnesses at Six Months*
(N = 108)



Frequency Missing = 23

Similar to the early infancy period, the prevailing health problem reported for infants between six months and one year of age was respiratory in nature.

Figure 6. *Childhood Illnesses at 12 Months*
(N = 67)



Frequency Missing = 13

EAR INFECTIONS

In the United States there were 11 million acute ear infections reported in 1996 for children less than five years of age (CDC). At 6 months, of the 85 respondents, none reported having an infant with an ear infection. At 12 months, 3 (6)% reported infants with ear infections out of 54 respondents.

CHILD SAFETY

The environment of the home is an important aspect of child safety, especially in the developmental months in which the child becomes increasingly mobile and curious of their surroundings. The leading cause of death for children between 1-14 years of age is unintentional injuries, and this is a time in which accidents and injuries may occur as a consequence of inadequate precautions regarding such things as fire, water, stairs, electricity, and small ingestible objects. At 12 and 21 months, child safety is assessed by the nurse home visitor using direct observation of the home environment by completing the Home Safety Checklist.

Table 22 provides a summary of home safety questions at infant age 12 months. Of particular interest, is the observation that mothers were most vigilant about ensuring that crib mattress fit snugly in crib, that medicines/vitamins were locked up, and cleaning supplies were not accessible to toddlers. Less effort was placed on structural environmental safety issues within the home, such as open unguarded windows of stair gates to protect children from falls. While only 5 participants reported guns were kept, in the home it is a concern that 3 of these homes failed to store guns in locked cabinets.

Table 22. *Child Safety at 12 Months of Age*

Safety Item	Frequency		Percentage		Frequency Missing	N
	Yes	No	Yes	No		
Space Heaters Safe	20	5	80.00	20.00	37	62
Fire Extinguisher in Home	11	14	44.00	56.00	37	62
Loose, Chipping, Peeling Paint	2	23	8.00	92.00	37	62
Cleaning Supplies Locked Up	21	4	84.00	16.00	37	62
Medicines and Vitamins Locked Up	23	1	95.83	4.17	38	62
Poison Control Center Number Posted	14	10	58.33	41.67	37	61
Ipecac Syrup in Home	14	11	56.00	44.00	37	62
Plastic Outlet Plugs in Place	13	11	54.17	45.83	38	62
Crib Mattress Fits Snugly in Crib	18		100.00		37	55
Gate at Top of Stairs	1	3	25.00	75.00	37	41
Gate at Bottom of Stairs	2	2	50.00	50.00	48	52
Open Unguarded Windows	2	22	8.33	91.67	38	62
Matches/Lighters Left Out		25		100.00	37	62
Guns Stored in Locked Cabinets	2	3	40.00	60.00	37	42
Unobstructed Exit	22	3	88.00	12.00	37	62
Fire Escape Plan in Place	9	14	39.13	60.87	39	62

SUBSEQUENT PREGNANCIES

As shown in Table 23, Washington State participants had a higher rate of subsequent pregnancies at 12 months than did participants in the Denver Clinical Trial. At 6 months the rates were comparable.

Table 23. *Percentage of Women With at Least One Subsequent Pregnancy at 6 and 12 Months Postpartum Washington State and Denver Clinical Trial Families*

	Washington State				Denver Clinical Trial			
	Frequency	Percent	Number	Frequency Missing	Frequency	Percent	Number	Frequency Missing
6 Months	5	5.0	107	15	11	5.2	235	25
12 Months	11	20.0	67	11	27	12.9	235	25

CHANGES IN WORKFORCE PARTICIPATION, MARITAL STATUS, EDUCATION, AND USE OF WELFARE

Two types of change are reported. Absolute change is the simple difference in percent of participants with a particular status (e.g. working, married, enrolled in school, or using community assistance programs) between intake and 6 or 12 months of infant age. The relative change is the absolute change divided by the percent of participants with a particular status at intake. Both percentages quantify the amount of change. However, the former simply describes the change in prevalence and the later emphasizes the extent to which the program may have changed participants' status. The statistical test examines whether the observed absolute difference is simply due to chance. One should also bear in

mind that the interpretation of change depends on the amount of participants with a particular status. If a status is too infrequent at intake it is usually not a viable outcome for evaluating the program effect on that status.

WORKFORCE PARTICIPATION AT PROGRAM INTAKE AND WHEN INFANTS ARE SIX AND TWELVE MONTHS OF AGE

Outcome analysis was conducted for participants who provided information about employment at program intake, 6 months, and 12 months of age. Table 24 shows that there was a non-significant decrease in absolute percent, 6%, in workforce participation between intake and 6 months of infant age. However, there was no change in workforce participation between intake and 12 months of infant age for the 24 participants. In the Denver Clinical Trials the absolute percent change observed between intake and 12 months of infant age was statistically significant with data for both time periods. The number of participants in Washington State for whom these data were available, however, suggest that caution should be exercised in drawing any conclusions based on these observed differences.

Table 24. *Currently Working at Program Intake, Infant Six and Twelve Months of Age*

		Program Intake		After		Change			Number	**Frequency Missing
		Frequency	Percentage	Frequency	Percentage	Frequency	Relative Percent	Absolute Percent		
Working Full or Part-time at 6 months	Washington State Families	35	44.3	30	37.9	-5	-14.3	-6.33	107	28
	Denver Clinical Trial Families	73	39.7	76	41.3	3	4.1	1.6	235	51
Working Full or Part-time at 12 months	Washington State Families	24	47.1	24	47.1	0	0.0	0.0	67	16
	Denver Clinical Trial Families	74	39.6	97	51.9	23	31.1	12.3*	235	48

* Statistically significant at $P < .05$

MARITAL STATUS AND EDUCATION AT PROGRAM INTAKE AND WHEN INFANTS ARE SIX AND TWELVE MONTHS OF AGE

Outcome analysis was conducted for participants who provided information on marital status at program intake, 6 months, and 12 months of age. Table 25 shows that there was a statistically significant increase in absolute percent, 10%, in those married between intake and 6 month of infant age, with 14 (16%) reporting they were married at program intake and 22 (26%) reporting they were married by the time the infant was 6 months of age. There was also a statistically significant increase in absolute percent, 19%, in those married between intake and 12 month of infant age, with 7 (14%) reporting they were married at program intake and 17 (33%) reporting they were married by the time the infant was 12 months of age. The numbers of participants in Washington State for whom these data were available, however, suggest that caution should be exercised in drawing any conclusions based on these observed differences.

Table 25. *Participants Married at Program Intake, Six and Twelve Months Infant Age*

		Program Intake		After		Change			Number	**Frequency Missing
		Frequency	Percentage	Frequency	Percentage	Frequency	Relative Percentage	Absolute Percent		
Married at 6 months	Washington State Families	14	16.67	22	26.19	8	57.14	9.52*	109	25
	Denver Clinical Trial Families	29	15.80	48	26.10	19	65.5	10.3*	235	51
Married at 12 months	Washington State Families	7	13.46	17	32.69	10	142.86	19.23*	67	15
	Denver Clinical Trial Families	30	16.04	58	31.00	28	93.3	14.96*	235	48

* Statistically significant at $P < .05$

Outcome analysis was conducted for participants who provided information on enrollment in school at program intake, 6 months, and 12 months of age presented in (see Table 26). There was a non-significant decrease in absolute percent, 1%, of the participants of reported on school enrollment between intake and 6 months infant age, with 23 (28%) reporting they were in school at intake and 22 (27%) reporting they were in school when the infant was 6 months. There was no change in school enrollment for the 11 (22%) participants enrolled at intake and 12 months of infant age. In the Denver Clinical Trial there was no significant change in enrollment in school between intake and 6 or 12 months infant age.

Table 26. *Participants Enrolled in School at Program Intake, Six and Twelve Months Infant Age*

		Program Intake		After		Change			Number	Frequency Missing
		Frequency	Percentage	Frequency	Percentage	Frequency	Relative Percent	Absolute Percent		
Enrolled in School at 6 months	Washington State Families	23	28.40	22	27.16	-1	-4.35	-1.23	107	26
	Denver Clinical Trial Families	55	29.90	57	30.90	2	3.60	1	235	51
Enrolled in School at 12 months	Washington State Families	11	21.15	11	21.15	0	0.00	0.00	67	15
	Denver Clinical Trial Families	56	30.00	56	30.00	0	0.00	0.00	235	48

* Statistically significant at $P < .05$

WELFARE USE WHEN INFANTS ARE SIX AND TWELVE MONTHS OF AGE

Washington State participants were asked to report their use of community service programs at intake and when their infant was 6 and 12 months old. Table 27 shows percentages of participants in four

government assistance programs from program entry until 6 months of age and from program entry until 12 months of age.

There were 85 participants who reported on enrollment in WIC, Medicaid, Food Stamps, or TANF/Welfare community service programs at intake and 6 months of age. There was a 13% statistically significant increase in the absolute change of the participants' use of WIC, use of Medicaid decreased with a small non-significant absolute change of 6%, use of Food Stamps increased with a non-significant absolute percent of 11%, and use of TANF/Welfare increased with a statistically significant absolute change of 19%.

There were 52 participants who reported enrollment in WIC Medicaid, Food Stamps, or TANF/Welfare community service programs at intake and 12 months. There was no change in the participants' use of WIC, use of Medicaid decreased with a non-significant absolute change of 12%, use of Food Stamps increased with a statistically significant absolute change of 17%, and use of TANF/Welfare increased with a statistically significant absolute change of 23%.

It is not unusual to see an increase in use of social programs after infants are born as women become eligible. This is a vulnerable period for the infants and their families and the use of such programs can provide the basis for future independence.

Table 27. Community Service Programs at Program Entry and Six and Twelve Months Infant Age

Washington State Families	+Frequency Missing	At Program Entry**		After**		Change		
		Frequency	Percentage	Frequency	Percentage	Frequency	Relative Percent	Absolute Percent
WIC								
Intake to 6 Months (N = 109)	24	72	84.7	83	97.7	11	15.3	12.9
Intake to 12 Months (N = 68)	16	43	82.7	43	82.7	0	0.0	0.0
Medicaid								
Intake to 6 Months (N = 109)	24	80	94.0	75	88.2	-5	-6.3	-5.9
Intake to 12 Months (N = 68)	16	50	96.2	44	84.6	-6	-12.0	-11.5
Food Stamps								
Intake to 6 Months (N = 109)	24	11	12.9	20	23.5	9	81.8	10.6
Intake to 12 Months (N = 68)	16	9	17.3	18	34.6	9	100.0	17.3
TANF/WIC								
Intake to 6 Months (N = 109)	24	10	11.8	26	30.6	16	160.0	18.8
Intake to 12 Months (N = 68)	16	6	11.5	18	34.6	12	200.0	23.1

* Statistically significant at $P < .05$

STRENGTHS AND WEAKNESSES

Overall, implementation of the nurse home visitation program in Washington State demonstrates the following strengths:

- Enrollment of mainly young, unmarried, low income women into the program.
- On average women received 8 home visits during pregnancy, with completed to expected visit ratio of 0.7.
- Low percentage of premature (6%) and low birth weight infant (6%).

Areas for improvement include:

- Attrition of clients from the program during pregnancy (14%) and during infancy (27%) is a potential area of concern, thus making it difficult to show the same benefits of the program as demonstrated in the Denver Clinical Trial.
- Nurse home visitors need to be more vigilant in the completion of the health Habits forms at intake, and 36 weeks pregnancy and Demographic update and Infant Health forms at 6 months of infancy and 12 months of infancy.
- Encourage home visitors to increase content focus on development of maternal role during infancy.

In summary, this evaluation report has examined salient features of program implementation and outcomes for the pregnancy and infancy phases. A follow-up report on the toddlerhood phase of the program will be prepared when a minimum of 50 participants have children who are 24 months of age or older.

REFERENCES

1. Olds, D., Henderson, Jr., C., Kitzman, H., Eckenrode, J., Cole, R., & Tatelbaum, R. The promise of home visitation: The results of two randomized trials. *Journal of Community Psychology*. 1998;26:5-21.
2. Olds, D.L., Eckenrode, J., Henderson, Jr., C.R., Kitzman, H., Powers, J., Cole, R., Sidora, K., Morris, P., Pettitt, L.M., & Luckey, D. Long-term effects of home visitation on maternal life course and child abuse and neglect: Fifteen-year follow-up of a randomized trial. *JAMA*. 1997;278:637-643.
3. Olds, D., Henderson, Jr., C.R., Cole, R., Eckenrode, J., Kitzman, H., Luckey, D., Pettitt, L.M., Sidora, K., Morris, P., & Powers, J. Long-term effects of nurse home visitation on children's criminal and antisocial behavior: 15-year follow-up of a randomized trial. *JAMA*. 1998;280:1238-1244.
4. Kitzman, H., Olds, D.L., Henderson, Jr., C.R., Hanks, C., Cole, R., Tatelbaum, R., McConnochie, K.M., Sidora, K., Luckey, D.W., Shaver, D., Engelhardt, K., James, D., & Barnard, K. Effect of prenatal and infancy home visitation by nurses on pregnancy outcomes, childhood injuries, and repeated childbearing: A randomized controlled trial. *JAMA*. 1997;278: 644-652.
5. Olds, D., Henderson, Jr., C., Phelps, C., Kitzman, H., & Hanks, C. Effects of prenatal and infancy nurse home visitation on government spending. *Medical Care*. 1993;31: 155-174.
6. Karoly, L.A., Greenwood, P.W., Everingham, SS., Hoube, J., Kilburn, M.R., Rydell, C.P., Sanders, M., & Chiesa, J. Investing in Our Children: What We Know and Don't Know About the Costs and Benefits of Early Childhood Interventions. Rand Corporation, 1998.

APPENDIX

COMPARISON OF SELECTED PROGRAM
IMPLEMENTATION DATA FOR
WASHINGTON STATE; OKLAHOMA CITY,
OKLAHOMA; AND GARFIELD COUNTY, OKLAHOMA

COMPARISON OF FIDELITY OF PROGRAM IMPLEMENTATION FOR WASHINGTON STATE, OKLAHOMA CITY, AND GARFIELD COUNTY

Table 28. Comparison of Participants Who Dropped during Pregnancy and Infancy by Reason for Washington State, Oklahoma City, and Garfield County

Reason for Drop	Pregnancy		Infancy	
	Frequency	Percent	Frequency	Percent
Washington State	(N = 207)		(N = 120)	
Declined further participation	12	5.80	13	10.83
Excessive missed appointments	0	0.00	1	0.83
Unable to locate	0	0.00	2	1.67
Moved out of service area	7	3.38	13	10.83
Miscarry/fetal death	5	2.42	1	0.83
Child not in custody	0	0.00	0	0.00
No home visits for ≥ 180 days	5	2.42	2	1.67
Total	29	14.01	32	26.67
Oklahoma City	(N = 1294)		(N = 847)	
Declined Further Participation	37	2.9	41	4.8
Excessive Missed Appointments	87	6.7	202	23.9
Unable to locate	37	2.9	34	4.0
Moved Out of Service area	14	1.1	31	3.7
Miscarry/Death	18	1.4	2	0.2
No home visits for ≥ 180 days	9	0.7	17	2.0
Total	202	15.6	327	38.6
Garfield County	(N = 287)		(N = 202)	
Declined Further Participation	9	3.14	20	9.90
Excessive Missed Appointments	7	2.44	12	5.94
Unable to Locate	7	2.44	8	3.96
Moved Out of Service area	7	2.44	14	6.93
Miscarry/Death	4	1.39	0	0.00
Child not in Custody	0	0.00	2	0.99
No home visits for ≥ 180 days	1	0.35	1	0.50
Total	35	12.20	57	28.22

Table 29. Comparison of Number and Duration of Nurse Home Visits for Pregnancy Washington State, Oklahoma City, and Garfield County

Site		Number	Average	Standard Deviation
Washington State	Pregnancy Completed	207	N/A	N/A
	Completed Visits	1585	7.7	4.3
	Expected Visits	2418	N/A	N/A
	Completed/Expected Ratio	N/A	0.7	0.3
	Average Visit Length (Minutes)	N/A	82.0	19.9
	Average Total Contact Time (Minutes)	N/A	626	378
Oklahoma City	Pregnancy Completed	1294	N/A	N/A
	Completed Visits	10663	8.2	4.1
	Expected Visits	15346	N/A	N/A
	Completed/Expected Ratio	N/A	0.8	0.4
	Average Visit Length (Minutes)	N/A	80.7	18.2
	Average Total Contact Time (Minutes)	N/A	662	364
Garfield County	Pregnancy Completed	287	N/A	N/A
	Completed Visits	2213	7.7	3.8
	Expected Visits	3320	N/A	N/A
	Completed/Expected Ratio	N/A	0.7	0.3
	Average Visit Length (Minutes)	N/A	71.3	22.5
	Average Total Contact Time (Minutes)	N/A	546.0	315.0

N/A: Not applicable.

Table 30. Comparison of Number and Duration of Nurse Home Visits for Infancy for Washington State, Oklahoma City, and Garfield County

Site		Number	Average	Standard Deviation
Washington State	Infancy Completed	120	N/A	N/A
	Completed Visits	1470	12.3	8.6
	Expected Visits	3338	N/A	N/A
	Completed/Expected Ratio	N/A	0.4	0.3
	Average Visit Length (Minutes)	N/A	73.9	13.8
	Average Total Contact Time (Minutes)	N/A	921	689
Oklahoma City	Infancy Completed	847	N/A	N/A
	Completed Visits	9295	11.0	9.4
	Expected Visits	24087	N/A	N/A
	Completed/Expected Ratio	N/A.	0.4	0.3
	Average Visit Length (Minutes)	N/A.	77.1	14.1
	Average Total Contact Time (Minutes)	N/A.	859	775
Garfield County	Infancy Completed	202	N/A	N/A
	Completed Visits	2068	10.2	8.2
	Expected Visits	5829	N/A	N/A
	Completed/Expected Ratio	N/A	0.4	0.3
	Average Visit Length (Minutes)	N/A	66.8	13.1
	Average Total Contact Time (Minutes)	N/A	681.0	555.0

N/A: Not applicable.

Table 31. Comparison of Proportion of Nurse Visit Time on Each Content Area and Program Protocol for Pregnancy and Infancy for Washington State, Oklahoma City, and Garfield County

Program Content Areas and Protocol	Washington State		Oklahoma City		Garfield County	
	Percent Time	Standard Deviation	Percent Time	Standard Deviation	Percent Time	Standard Deviation
Pregnancy	(N = 207)		(N = 1294)		(N = 287)	
Personal Health	42.3	11.7	39.2	13.5	32.2	10.9
Environmental Health	11.1	8.2	10.7	5.7	15.0	4.9
Life-course Development	11.8	7.0	13.4	6.5	15.5	4.7
Maternal Role	18.7	8.0	20.8	7.7	21.4	6.3
Friends & Family	15.6	6.4	15.7	6.0	16.3	4.8
Program Protocol	86.7	11.9	88.3	12.0	95.3	9.6
Infancy	(N = 120)		(N = 847)		(N = 202)	
Personal Health	20.8	10.3	21.8	7.8	19.2	5.5
Environmental Health	9.0	5.0	13.4	5.0	16.3	4.0
Life-course Development	14.2	7.3	16.0	5.9	16.8	4.2
Maternal Role	40.6	9.3	33.1	11.0	31.9	10.0
Friends & Family	14.9	4.7	15.7	5.3	16.0	4.6
Program Protocol	89.9	8.1	86.6	12.4	97.3	6.3

COMPARISON OF BIRTH OUTCOMES FOR WASHINGTON STATE, OKLAHOMA CITY, AND GARFIELD COUNTY

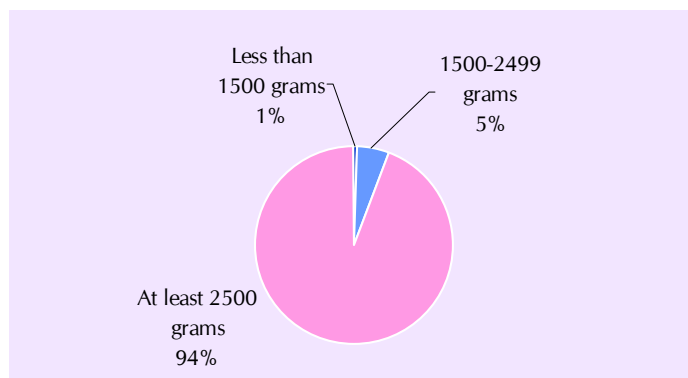
Table 32. Comparison of Distribution of Infants by Gender for Washington State, Oklahoma City, and Garfield County

Site	Gender	Frequency	Percent
Washington State (N = 175) Frequency Missing = 15	Male	82	51.3
	Female	78	48.8
Oklahoma City (N = 1039) Frequency Missing = 114	Male	452	48.86
	Female	473	51.14
Garfield County (N = 245) Frequency Missing = 24	Male	111	50.23
	Female	110	49.77

Table 33. Comparison of Gestational Age of Infant at Birth for Washington State, Oklahoma City, and Garfield County

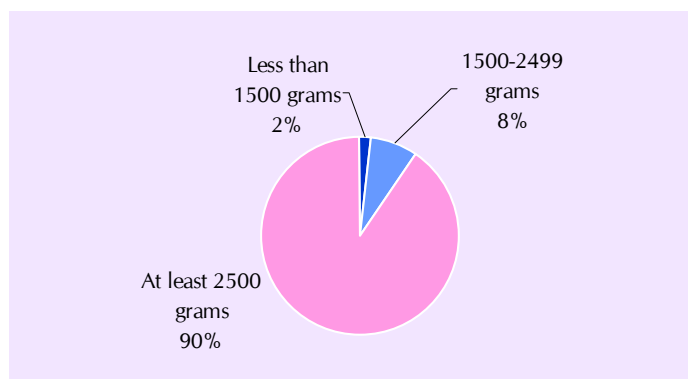
Site	Gestational Age	Frequency	Percent	Cumulative Frequency	Cumulative Percent
Washington State (N = 175) Frequency Missing = 24	28 weeks or less	1	0.7	1	0.7
	29 - 36 weeks	8	5.3	9	5.9
	37 - 40 weeks	110	72.9	119	78.8
	Greater than 40 weeks	32	21.2	151	100.0
Oklahoma City (N = 1039) Frequency Missing = 160	28 weeks or less	9	1.02	9	1.02
	29 - 36 weeks	90	10.24	99	11.26
	37 - 40 weeks	664	75.54	763	86.80
	Greater than 40 weeks	116	13.20	879	100.00
Garfield County (N = 245) Frequency Missing = 25	28 weeks or less	2	0.91	2	0.91
	29 - 36 weeks	28	12.73	30	13.64
	37 - 40 weeks	149	67.73	179	81.36
	Greater than 40 weeks	41	18.64	220	100.00

Figure 7. *Infant Birth Weight in Grams for Washington State*
(N = 175)



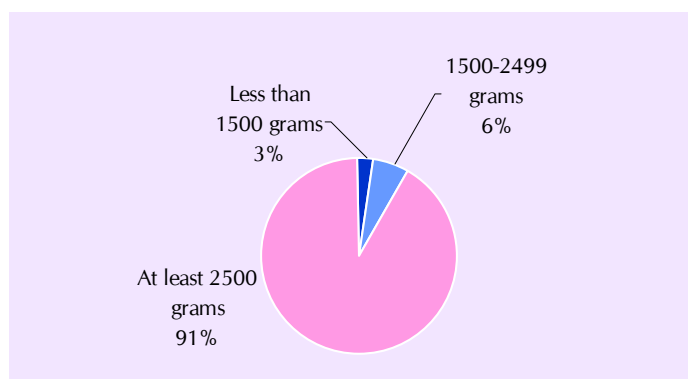
Frequency Missing = 21

Figure 8. *Infant Birth Weight in Grams for Oklahoma City*
(N = 1039)



Frequency Missing = 111

Figure 9. *Infant Birth Weight in Grams for Garfield County*
(N = 245)



Frequency Missing = 23